Remarks

1. Introduction

Claims 1-32 are pending.

2. Double Patenting

Claims 1, 12, 17, 27, and 29 of the present application were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/684,222, (hereinafter referred to as "the '222 application"). Claims 2, 5, 16, 18, 20, and 28 of the present application were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 7 of the '222 application. Claims 10 and 14 of the present application were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 10/684,208 ("the '208 application"). Claims 11, 15, and 26 of the present application were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 9 of the '208 application.

Applicants state that, upon receiving allowable subject matter, they will submit a terminal disclaimer.

3. Rejections based on 35 U.S.C. §§102, 103

Claims 1-3, 5-30 were rejected under 35 U.S.C. 102(e) as being anticipated U.S. Patent Publication No. 2003/0179891 A1 (Rabinowitz et al). Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over the Rabinowitz reference.

The Rabinowitz reference discloses a significantly different system from that disclosed and claimed in the present application. As one example, the Rabinowitz reference teaches an analysis that focuses on a single input. Specifically, while the Rabinowitz reference discloses taking measurements for multiple listening positions, the Rabinowitz reference teaches that the measurements are simply averaged to generate a single input for the analysis. See paragraph [0031] ("At step 54, the data signals for all the positions may be combined by the acoustic measuring circuitry 19 (by some method such as energy averaging) and an equalization pattern developed from the data signals."). In this way, the Rabinowitz reference fails to teach, or even

suggest, generating predicted transfer functions at each of the plurality of listening positions. And, because the Rabinowitz reference only focuses on an average of the seat positions, the Rabinowitz reference is unable to reduce the variance from one listening position to the next. For example, in the event that there is a variation in the loudness from one seat to the next, the Rabinowitz reference cannot select a correction factor that reduces the variation between the seats.

By contrast, the claims recite predicting the transfer functions at each of the plurality of listening positions and statistically analyzing the predicted transfer functions at the plurality of positions. See claim 1 ("statistically analyzing across at least one frequency of the predicted transfer functions for the plurality of listening positions"); claim 12 ("instructions for statistically analyzing across at least one frequency of the predicted transfer functions for the plurality of listening positions"); claim 17 ("modifying the transfer functions based on the potential correction factors in order to generate predicted transfer functions for each of the plurality of listening positions"); claim 27 ("logic for modifying the transfer functions based on the potential correction factors in order to generate predicted transfer functions for each of the plurality of listening positions" and "logic for statistically analyzing the predicted transfer functions to determine at least one characteristic of the predicted transfer functions across the plurality of listening positions"); claim 29 ("modifying the transfer functions based on the potential values in order to generate predicted transfer functions for each of the plurality of listening positions" and "statistically analyzing the predicted transfer functions to determine at least one characteristic of the predicted transfer functions across the plurality of listening positions"). Because of the predicting/analyzing of the transfer functions at the plurality of listening positions, present application can select correction factors which improve any characteristic across the different listening positions, such as flatness, consistency, efficiency, smoothness, etc. The Rabinowitz reference is entirely incapable of making such improvements across the listening positions. For at least this reason, the claims as currently presented distinguish over the cited reference.

As another example, the Rabinowitz reference teaches that the equalization calculation circuitry only generates a single equalization. Specifically, the Rabinowitz reference teaches the following:

> Equalization calculation circuitry 18 furnishes an equalization pattern signal appropriate to achieve a desired frequency response, and stores the equalization pattern signals in memory 20. Thereafter, when the audio signal processing circuitry 12 receives an audio

> signal from audio signal source 10, the equalization pattern signal is transmitted to audio signal processing circuitry 12, which furnishes in accordance with the equalization pattern, the audio signals transmitted to loudspeaker units 14-1-14-6 for transduction to sound waves.

Paragraph [0022]. Thus, the Rabinowitz reference teaches a single "equalization pattern signal" to be output. This single "equalization pattern signal" is, in effect, a single degree of freedom equalization to correct the sound for a channel in the audio system. Specifically, for a specific channel on the audio system, the "equalization pattern signal" is applied for correction of all signals on the channel. In contrast, the invention as claimed includes a multiple degree of freedom equalization. Specifically, claims 33-35 recite an audio system where the correction factors selected are different for different loudspeakers in the audio system. In this way, for different loudspeakers on the same channel (such as subwoofers), different correction factors may be selected. While significantly complicating the analysis, the ability to use different correction factors in the loudspeakers provides for much greater ability to equalize the audio system.

The Rabinowitz reference also fails to teach the specific statistical analyses as claimed. Specifically, the Office Action rejects claims 6-8 and 10-11, relating to the statistical analyses, as being anticipated by the Rabinowitz reference, citing paragraph [0031] of the Rabinowitz reference. For ease of reference, paragraph [0031] is reproduced below:

> [0031] While an equalization pattern may be calculated based on data from a single location, acquiring data from more than one location generally gives a better result. At step 52, the measurements and tests of step 48 may then be repeated for the second location, preferably for each loudspeaker unit. At the second location an additional test may also be performed, to determine whether the second location is too close to a previous location. One method of determining if a location is too close to a previous location is to compare the frequency response at the second location with the frequency responses at the previous location. If the any of the tests, including the "closeness" test, indicate an invalid measurement, at step 53, the user may be instructed to move or make a correction as in step 49. Steps 50, 52, and (if necessary) step 53 may then be repeated for more locations. If desired, a fixed number (such as five) of locations or a minimum number (such as four) of locations or a maximum number (for example eight) of locations may be specified. If measurements have not been taken at the minimum number of locations, the user may be instructed to move to another location. If measurements have been taken at the maximum number of locations (or if measurements have been taken at the minimum number and the user indicates that measurements have been taken at all desired locations), the process proceeds to step 54. At step 54, the data signals for all the positions may be combined by the acoustic measuring circuitry 19 (by some method such as energy averaging) and an equalization pattern developed from the data

> signals. At step 55, an equalization pattern is calculated. At step 56, the equalization pattern may be compared with the loudspeaker unit characteristics stored in memory 20 to ascertain that no limits (such as dB of correction) are exceeded, and the equalization pattern may be modified so that the limits are not exceeded. At step 58, the filters appropriate to achieve the equalization pattern are calculated and representative signals stored for use by audio signal processing circuitry 12. As stated previously, the filters may be stored in terms of filter coefficients or filter singularities.

Claim 6 recites "where the statistical analysis indicates efficiency of the predicted transfer functions for the plurality of listening positions." Applicants respectfully contend that paragraph [0031] of the Rabinowitz reference (or any other portion thereof) does not teach statistically analyzing based on efficiency of the predicted transfer functions at the plurality of listening positions. As a general matter, the Rabinowitz reference fails to teach or suggest any predicting/analyzing of the transfer functions at the plurality of listening positions, as discussed above. In addition, the Rabinowitz reference fails to teach any statistical analysis relating to efficiency. Applicants reproduce the relevant portion of paragraph [0031]

> At step 54, the data signals for all the positions may be combined by the acoustic measuring circuitry 19 (by some method such as energy averaging) and an equalization pattern developed from the data signals. At step 55, an equalization pattern is calculated. At step 56, the equalization pattern may be compared with the loudspeaker unit characteristics stored in memory 20 to ascertain that no limits (such as dB of correction) are exceeded, and the equalization pattern may be modified so that the limits are not exceeded. At step 58, the filters appropriate to achieve the equalization pattern are calculated and representative signals stored for use by audio signal processing circuitry 12. As stated previously, the filters may be stored in terms of filter coefficients or filter singularities.

As shown by the above excerpt, there is no discussion of any efficiency analysis. And, there is no discussion of an efficiency analysis for "predetermined frequencies" (see claim 7) and no discussion to select "a value for the correction factor to increase efficiency of the audio system in the predetermined frequencies." See claim 8; see also claims 13 and 21-23.

Claim 10 recites a statistical analysis that "indicates consistency of the predicted transfer functions across the plurality of listening positions." See also claims 14 and 25. Claim 11 recites a statistical analysis that "indicates flatness for the predicted transfer functions for the plurality of listening positions." See also claims 15 and 26. As shown in the above excerpt, the Rabinowitz reference does not teach any analysis based on consistency or flatness across the plurality of listening positions. This is easily illustrated by a trivial example of two room responses at two different seats, one which has a large peak at a given frequency and one with a

corresponding dip at that frequency. Evaluation of the spatial average (as taught in the Rabinowitz reference) would suggest an optimal and "flat" response had been achieved. Statistical analysis according to the claims as presented would not. For at least the reasons stated, the claims as presented are patentable over the references of record.

6. Conclusion

The Examiner is invited to contact the undersigned attorneys for the Applicant via telephone if such communication would expedite this application.

Respectfully submitted,

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